JAPAN BUDGET

Science Spending Keeps Rising But May Miss 5-Year Targets

Japanese scientists appreciate the boost in government spending, even if it falls short of the goal. But money isn't everything, they say

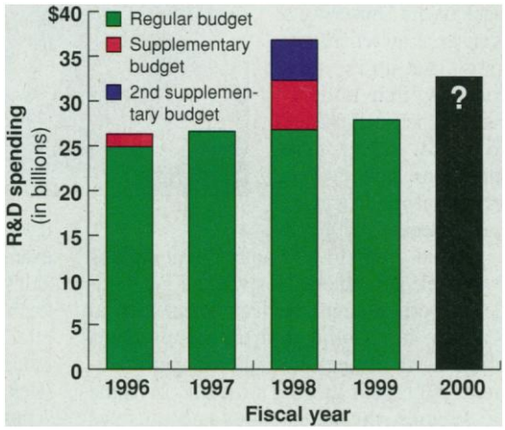
TOKYO—Money talks, and for the past 3 years Japanese scientists have been listening closely to whether the government is keeping its promise to dramatically increase spending on science. They have been hearing some mixed signals.

The numbers are climbing, and science is expected to get another boost this week when legislators approve the fourth of five annual budgets covered by a key 5-year spending plan (see graph). That's a significant achievement for a country mired in an 8-year recession. But it's becoming clear that the ambitious spending goals won't be met and that institutions are lagging in adopting reforms to ensure that the money is put to good use. Some scientists also grumble that the government is favoring research with commercial potential. And many institutions marked for growth are in the awkward position of seeing their operating budgets shrink while they are building new facilities.

The 5-year spending plan grew out of a 1992 recommendation from the Council for Science and Technology, the nation's highest science advisory body. The council asked the government "as soon as possible" to double annual spending on research, then $18.6 billion. (All budget figures understate actual spending because they do not include salaries.) The resolution was embedded in a 1995 Basic Law for Science and Technology and a 5-year plan endorsed in 1996 by the Cabinet (*Science*, 28 June 1996, p. 1868).

To meet their promise, officials agreed to spend 17 trillion yen ($150 billion) over the 1996–2000 period. But instead of incremental increases that would have lifted the regular 2000 R&D budget to twice the 1992 level, the government decided to count spending in supplemental budgets as well as in annual budgets. Supplemental budgets are an increasingly frequent mechanism to stimulate the economy with quick-spending schemes. The downside is that supplemental spending doesn't raise the base, and with 10% of the increase for science stuffed into three massive supplemental budgets, the regular science budget has grown much more slowly than anticipated. Even a whopping 17% increase next year, the amount needed to hit the 5-year target of 17 trillion yen, would result in a 2000 budget that's only 75% higher than the 1992 level of $18.6 billion. "Spending is still below the level we would like to see," says Masayuki Shibata, director of the office of science policy at Monbusho, the Ministry of Education, Science, Sports, and Culture.

Despite that shortfall, most scientists and administrators praise the government's overall track record. "We have to thank our politicians [for this support]," says Masao Ito, a neuroscientist at the Institute of Physical and Chemical Research (RIKEN), outside Tokyo.



Numbers game. Next year's regular R&D budget would have to rise sharply to meet promised 5-year spending levels.

There is no question that funding for actual research has expanded dramatically. For example, Monbusho's Grants-in-Aid program for research at universities and Monbusho-affiliated institutes has jumped nearly 30% since 1996, to $1.16 billion. And both Monbusho and the Science and Technology Agency (STA) have initiated or expanded programs that handsomely reward the most active and innovative researchers and groups. "The variety of programs and their different approaches have really helped make the research environment more active," says Hiroyuki Yoshikawa, an engineer who is president of the Science Council of Japan, the nation's leading private science association. That assessment is shared by Katsuhiko Sato, a cosmologist at the University of Tokyo who heads a nine-member group that in 1995 was among the first batch of successful applicants for a Monbusho Centers of Excellence program. The 5-year, $15 million award has enabled them to search for antiprotons, conduct particles work, and do theoretical studies on the early universe.

But there have also been disappointments. Last year's regular budget actually cut operating funds for many big science projects at the same time the two supplemental budgets boosted spending on buildings and equipment (*Science*, 1 May 1998, p. 669). The cuts "went against the intent of the 5-year plan," complains Akiyoshi Wada, a biophysicist who heads RIKEN's new Genomic Science Center.

In addition, some believe that the spending has not benefited all fields. "I don't think the spending has been very balanced," says Keiichi Kodaira, director-general of the National Astronomical Observatory, near Tokyo. Aside from the Centers of Excellence initiative, he says, the new programs typically fund fields deemed economically strategic, such as nanotechnology, information sciences, and molecular biology. And while the government has equipped new buildings with the latest instruments in neuroscience and genetics, the high-energy physics community recently had to combine plans for two accelerators (*Science*, 8 January, p. 155). "It seemed the only way we could get funding," says Sakue Yamada, a director of the High Energy Accelerator Research Organization in Tsukuba.

Although the 17-trillion-yen target has received most of the attention, the 5-year plan called for institutional reforms as well. Progress here has been mixed. Although practically all of the major institutes and university departments have heeded calls for independent reviews, most have been done by in-house committees. Still, Monbusho's Shibata says that this has helped shake up lethargic university researchers. "They are afraid of losing face," he says.

The going has been tougher for those trying to replace the current lifetime employment system for national employees with limited-term appointments or schemes that require faculty to earn tenure. Only 19 of 98 national universities have introduced modifications to lifetime employment, and typically only in very limited ways. "I'm not optimistic about [limited-term appointments] being adopted," says Yoshikawa, a former president of the University of Tokyo.

While researchers may debate the government's success in keeping its commitment, few dispute the overall positive effect of the 5-year plan. And most are optimistic that the upward spending trend will continue. "There is consensus among all the political parties on the importance of research-related spending," says Yoshikawa. **–DENNIS NORMILE**

SOURCE: SCIENCE AND TECHNOLOGY AGENCY